MAJOR :CEL717 ADVANCED STRUCTURAL ANALYSIS
(2013-14)

NOTE: (a) All questions are compulsory. (b) Draw neat and clear sketches wherever required.
(c) Assume suitable data if necessary. (d) Assume members as extensible unless otherwise stated.
(e) All answers must be supported by calculations/ justification to secure assigned marks.
(f) THIS QUESTION PAPER CONTAINS TWO PARTS (A) AND (B) TO BE ANSWERED ON
SEPARATE SHEETS

PART (A)

Q1. Explain all possible failure mechanisms for a typical symmetrical inclined rigid portal frame   **(4 marks)**

Q2. Analyse the frame shown in Fig.1 using the plastic analysis approach. The plastic moment capacities of various members are indicated in the figure. Check all the possible mechanisms for satisfaction of yield criterion.   **(9 marks)**

Q3. Derive the flexibility matrix of the structure shown in Fig. 2, such that it should enable you to determine the deflection under the load P (i.e. at C) and the rotation at B. **Assume both members have constant EI = L/6.**
(6 marks)

Q4. Explain briefly the process of substructures using mathematical formulations. When do you think the process could be useful?   **(4 marks)**

Q5. Using the cantilever structure shown in Fig. 3, show all steps involved in condensing the stiffness matrix of the structure in terms of the lateral deflections at points B and C.   **(5 marks)**
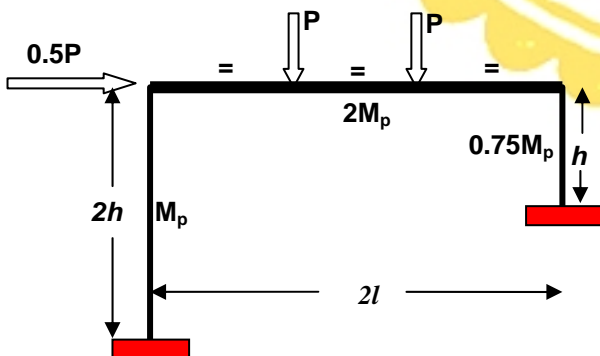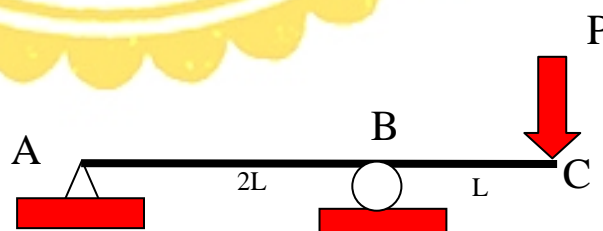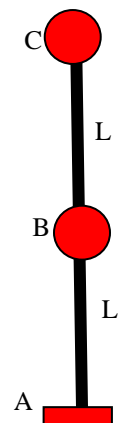

Fig. 1

Fig. 2

Fig. 3